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# *Farm and Home Science*



AGRICULTURAL EXPERIMENT STATION  
OF THE UTAH STATE UNIVERSITY

Vol. 18 No. 3

SEPTEMBER 1957

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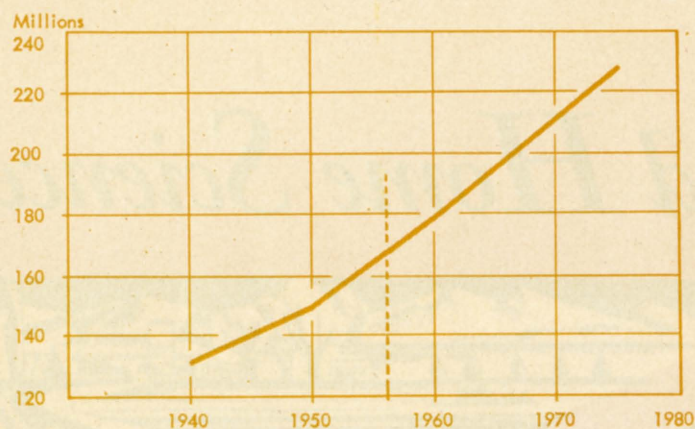


Fig. 1. Population of the United States: actual 1940 to 1956 and maximum projections for 1960 and 1975

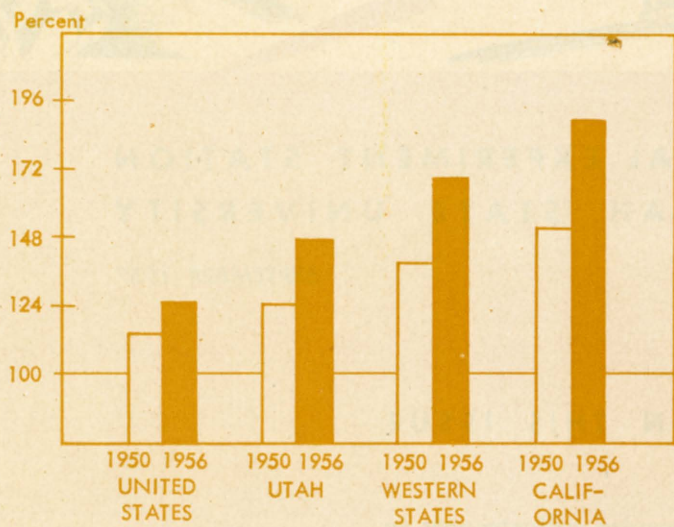


Fig. 3. Percentage increase in population in selected areas: 1950 and 1956 over 1940

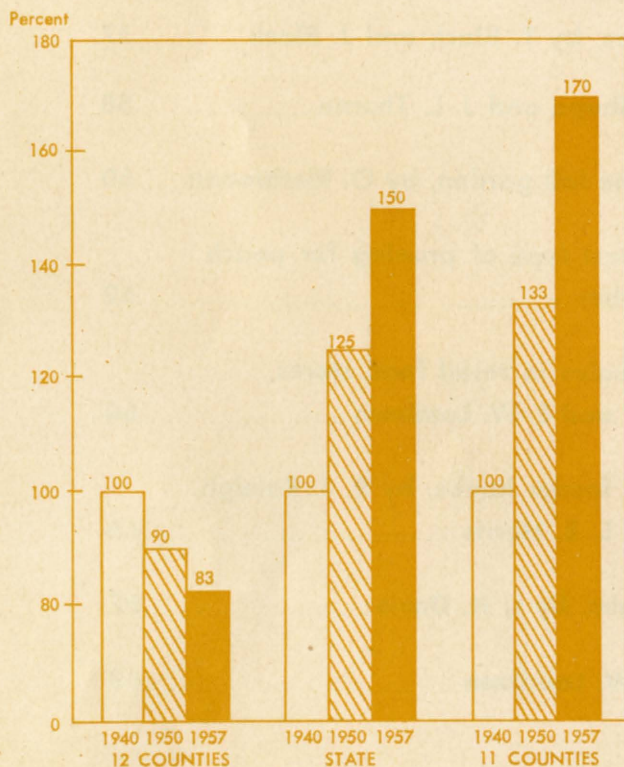


Fig. 4. Population in Utah and two selected groups of counties in 1950 and 1957 compared with 1940

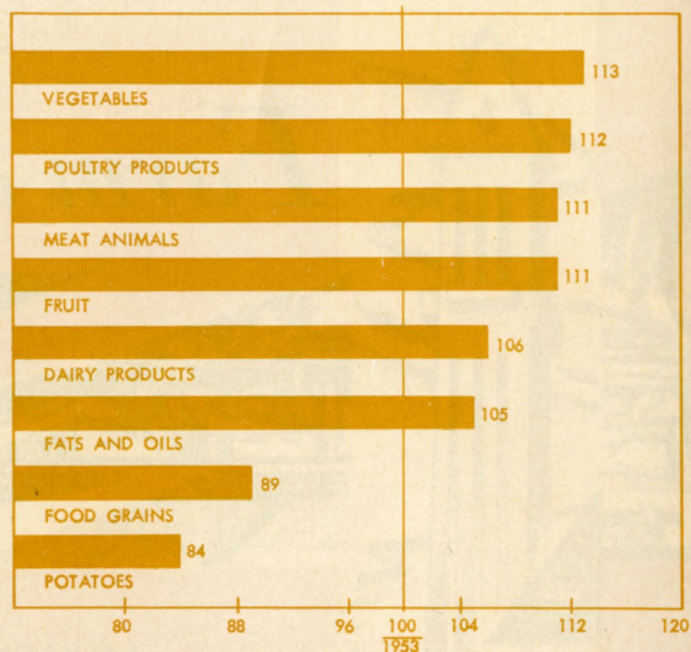


Fig. 2. Projected per capita consumption of selected food products in 1975

1953=100

The intent of this article is to call attention to some changes associated with the "farm problem." Their effects in the long run may be good for farmers and the nation as a whole. In the short run they have brought economic troubles to many farmers. The effects of the changes in markets, and in production practices, combined with resulting changes in production rates and man labor requirements are forcing individual farmers to enlarge the size of their farms or depend on off-the-farm employment for at least part of their living.

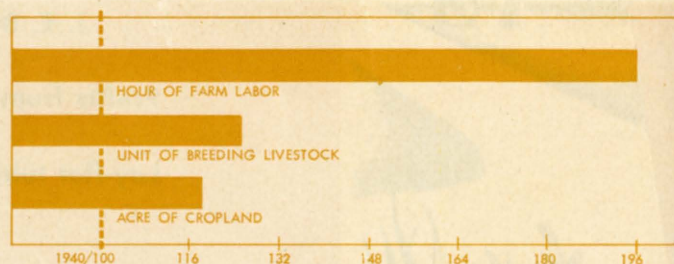


Fig. 5. Farm output per unit of selected resources, United States, 1956

1940=100



# ECONOMIC CHANGES

## Require Adjustments in Agriculture

GEORGE T. BLANCH

**C**HANGE is characteristic of the American economic system. In no part of the economy, however, has change been more evident during the past two decades than in agriculture. The current "agricultural problem" is largely a manifestation of the difficulties in adjusting to changes. Because of these changes and the uncertainty of weather, which influences agricultural output, the balance between supply and demand at a satisfactory price is difficult to achieve.

### Fluctuations in the Export Market

Although the foreign market for farm products is much less important than the domestic market, it is still important. War has caused much of the fluctuation in total exports of American agricultural products. The quantity of agricultural products exported from the United States increased almost 50 percent as a result of World War I. During the depression which followed, exports declined to only 40 percent of the 1918 level. With the advent of World War II, exports again increased almost to the 1918 level. Since that time they

have declined to approximately the level of 1910-14. Following each upswing in the quantity of products exported, additional lands were brought into production to meet this expanded market. With the reduction in the export market, surpluses tended to pile up.

Studies within the United States Department of Agriculture which project agricultural exports into the future indicate that over the next 15 years the quantity of agricultural products exported will increase. It must be understood, of course, that any projections into the future are based on assumptions that may or may not develop.

### The Domestic Market Changes

Of greater importance to American agriculture are changes in the domestic market.

**More Mouths to Feed.** Most important is the increase in total population. During the 10 years from 1940 to 1950, the total population of the United States increased by almost 20 million or 14.8 percent

of the 1940 population. Between 1950 and 1955, the increase was almost 15 million. During the decade, 1940 to 1950, the increase was at an average rate of 1.5 percent per year. Students of population all anticipate that this increase will continue into the future. Estimates range as high as 228 million people in 1975. If the highest figure is realized, this would be an average increase of more than 3 million people per year between 1955 and 1975, an addition to the total market each year equivalent to more than three times the present market in the state of Utah.

### Higher Incomes Will Increase Buying Power

In addition to an enlarged market as measured by numbers of people, economists predict that the per capita incomes will continue to rise. The increase in total population and the increased purchasing power of consumers are not the only changes of significance. As incomes increase, more dollars are spent for foodstuffs. Under some circumstances this may represent increased quantities of food pur-

●  
**DR. GEORGE T. BLANCH** is professor and head of the Department of Agricultural Economics.

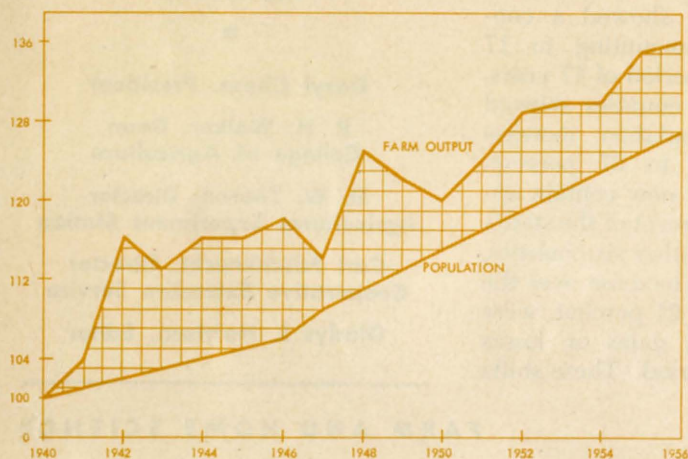


Fig. 6. Relative change in population and total farm output, United States, 1940-1956

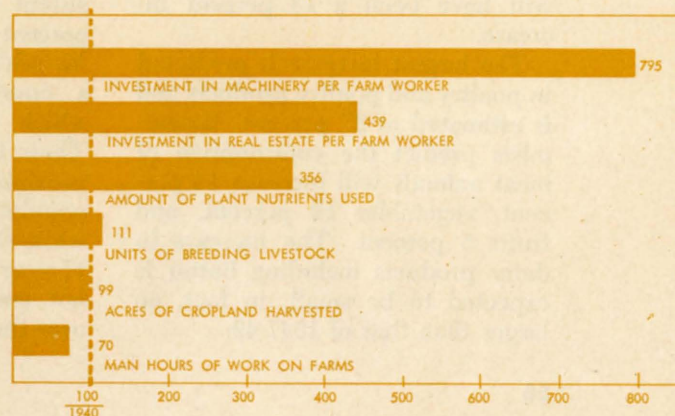


Fig. 7. Resources used in agriculture in 1956 compared with 1940, United States



chased and consumed, but in most cases it probably represents the purchase of larger quantities of high-priced foodstuffs. Available statistics from the Department of Agriculture indicate that in 1953 the per capita consumption of all foods as measured at the farm was 1 percent above the consumption in 1947-49. The studies that project this consumption into the future show that by 1975 the per capita consumption may be 10 percent above the 1947-49 level. These changes can be illustrated by changes that are already under way.

#### **Trend is to Eat Less Carbohydrate**

The per capita consumption of food grains has been going down for many years. In 1953 it was 8 percent less than the average of the years 1947-49. By 1975 economists estimate that it will be 18 percent below the 1947-49 consumption.

The per capita consumption of potatoes is expected to decline even more rapidly. In 1975 we expect it to be 26 percent less than the 1947-49 consumption. Between 1947-49 and 1953, consumption of potatoes per capita declined 12 percent.

#### **Consumption of Livestock Products, Fruits and Vegetables to Increase**

On the other hand, the consumption of livestock products, vegetables, and fruits has been and is expected to continue to increase. Again the studies from the United States Department of Agriculture show that per capita consumption of all livestock products increased 3 percent between 1947-49 and 1953, and that by 1975 there will have been a 13 percent increase.

The largest increase is predicted in poultry and poultry products and is estimated at 27 percent. Economists predict the consumption of meat animals will increase 14 percent, vegetables 19 percent, and fruits 5 percent. The increase in dairy products including butter is expected to be small; in fact, no larger than that of 1947-49.

While there is no assurance that the projections of agricultural exports, the size of the domestic population, or changes in consumption habits of people will turn out to be exactly as projected, the trends will probably be in the general direction indicated. At any rate the results of these studies provide us with some guideposts for directing the agriculture of the future.

#### **Other Changes that Affect Utah Agriculture**

To a local area such as Utah, the national changes mentioned are not the only changes of significance.

*Westward movement of population.* The location of the consuming population is of great concern to each agricultural area. To have a large consuming population relatively close to sources of production is an advantage.

The center of the United States population is gradually moving westward. While the increase in the national population was 25 percent from 1940 to 1956, the 11 western states increased slightly more than 68 percent. The increase in the state of California, perhaps the most important market for Utah products, was near 90 percent. In general, these population shifts mean markets closer to home for Utah producers.

*Changes in Utah population affect farm markets.* Significant changes have also taken place within Utah. Most recent population estimates on a county basis for January 1, 1957, show an overall increase of 50 percent between 1940 and 1957. During this time, however, 12 counties showed a consistent decline amounting to 17 percent over the period of 17 years. An additional 11 counties showed a consistent population increase which amounted to 67 percent. These 11 counties now contain approximately 87 percent of the state's population. The other six counties, while showing an increase over the 17-year period of 21 percent, were not consistent in gains or losses over the entire period. These shifts

in population within the state change the nature as well as the size, of the market for many agricultural products.

#### **Changes in Output per Unit of Farm Resources**

Equally important to changes in markets and market outlets are changes in the output per unit of resources used in producing farm commodities. Because of improved crop varieties, better seeds, greater use of fertilizers, insect and disease control methods, better timing of farm operations, and other improved production practices, acre yields of farm crops have increased over the past 2 decades. While yields vary from year to year depending on general growing conditions, the trend is definitely upward. Between 1940 and 1956 crop production per acre in the United States increased 20 percent, while the increase per livestock unit amounted to 27 percent. The increase in production of livestock can likewise be attributed to the expansion of knowledge in the sciences and skills of management. There is no reason to suppose that this general trend will not continue

(Continued on page 73)

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## **FARM AND HOME SCIENCE**

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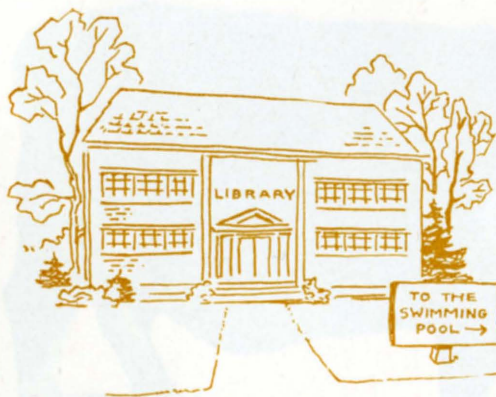
**Gladys L. Harrison, Editor**

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Participation in organizations is an important feature of American society

Community betterment can come from enlightened participation



In this article the authors discuss some of the findings of a study in Clearfield, Utah

# VOLUNTARY ORGANIZATIONS

## *Important community resources*

THEREL BLACK AND JERRILYN BLACK

ORGANIZATIONS are human resources for any community. When they remain flexible, creative, and active, they are invaluable as tools to help identify and solve community problems.

A first step in research into factors that inhibit or increase the effectiveness of these groups has been made in three Utah communities. This step is to discover the number and type of organizations in the community as well as patterns of participation. Some of the findings about one of these communities, Clearfield, are presented here. Our purposes have been to gain a descriptive profile of organ-

ization membership and activity as well as to find evidence of causal relations. Other findings will be presented later in an Experiment Station bulletin.

### Organizations in Clearfield

Organizations are groupings of people where membership is voluntary, where officers are chosen or designated, and where meetings are held at least once each year. Organizations are classified into five groups: church, social, educational, civic, and economic. The following are some of the social, educational, civic, and economic organizations for adults in Clearfield:

Women's literary club  
Bridge or other card clubs  
Garden club  
Young married couples club

Pinochle club  
School teachers' club  
Music club  
Dramatics club  
Special art activities club  
Sewing circle  
Federated women's club  
Friendship club  
Rotary International  
Golden Spike  
American Association of University Women  
Business and Professional Women  
Cup N Saucer  
Social club  
Base Women's club  
Neighborhood club  
Men's club  
Sergeants' club  
Executive club at Hill Field  
Country club  
Veterans of Foreign Wars  
Elks  
Masons  
Rebeccas  
I.O.O.F.  
Lion's  
Square dancing club  
Social dancing club

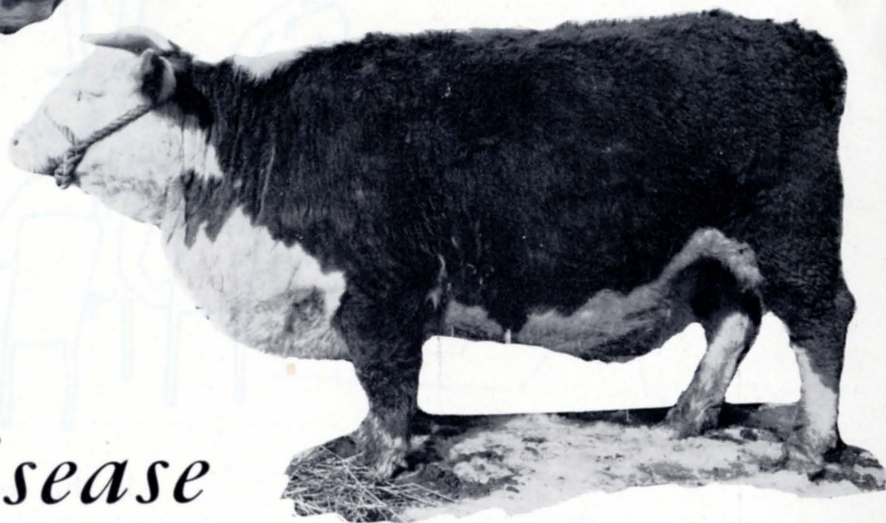
(Continued on page 71)

DR. THEREL BLACK is associate professor of sociology. JERRILYN BLACK is a graduate student in a doctoral program at Utah State.





Typical cases of brisket disease showing accumulation of fluid in abdominal cavity and in the brisket region



# Brisket Disease

LE GRANDE SHUPE  
JOSEPH L. THORNE

Research is piecing together the parts that will add up to a solution of the disease problem

**I**NTENSIVE post mortem studies of animals with brisket disease are pointing out clues which may lead eventually to its cause and therewith to a means of preventing the disease in range livestock.

Veterinarians at Utah State have found that animals that die from the disease have an enlarged right side of the heart and in addition a generalized accumulation of fluid in the abdominal and thoracic cavities, and in the tissues of the abdomen, brisket, and throat region. The liver is enlarged and hardened. The cause of the accumulation of fluid and the liver changes can be attributed to changes in the right side of the heart. The cause of the failing right side of the heart is not known definitely.

DRS. SHUPE and THORNE are members of the Department of Veterinary Science.

But more recent work done at Utah State indicates that the cause of the heart changes may be found in the lungs. Definite changes in the lungs are found in most cases of brisket disease. In some cases blood clots were found in the blood vessels carrying the blood from the right side of the heart through the lungs. In other cases degeneration and thickening of vessel walls with disappearance of the openings of these vessels were observed. These conditions would offer resistance to blood flow through the vessels of the lungs, with a resultant dilatation and enlargement of the right side of the heart and a subsequent congestive heart failure. In addition to these changes in the lungs, multiple abscesses, severe diffuse lung-worm infestation, collapse of the pulmonary alveoli, and congestion and emphysema of the pulmonary tissue were observed.

## Disease Studies in Utah

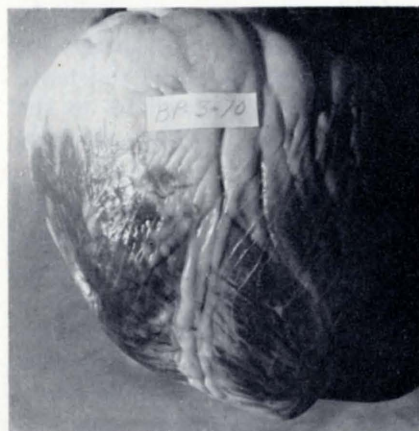
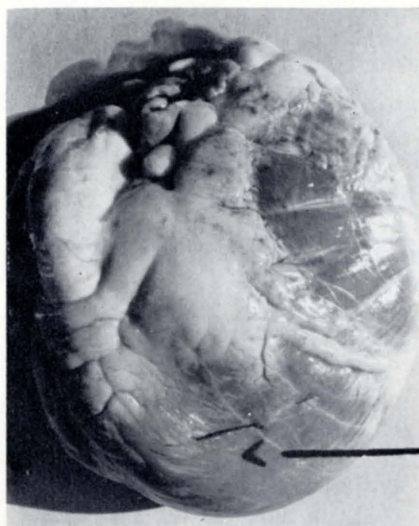
Studies on brisket disease were started at the Utah Station ten years ago when the condition was brought to the attention of the Department of Animal Husbandry by the county agent of Wayne County. The disease has also been found in Sevier, Piute, Duchesne, and Uintah Counties. It has been known to exist in the state for more than 30 years.

Brisket disease affects animals after they have been grazing on high mountain ranges during the summer months. However, it sometimes affects animals on areas at lower elevations. It has occurred during winter and spring months before cattle were moved to the higher summer ranges.

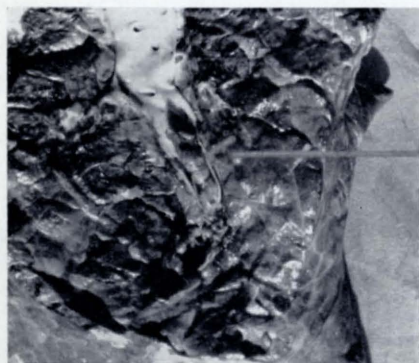
## Symptoms

The disease manifests itself as a severe depression with respiratory





Top, heart from a typical case of brisket disease showing extreme hypertrophy and dilatation of the right side. Below, normal heart.



Lung tissue showing a blood clot in the artery which carries blood from the heart to the lungs.

difficulty and loss of appetite. Affected animals stand away from other animals. They usually have a rough hair coat, a distended abdomen caused by an accumulation

of fluid in the abdominal cavity, and often have a profuse diarrhea. Frequently they have a swollen brisket caused by an accumulation of fluid under the skin and in the adjacent tissue. The swelling may extend up to the neck and may also become prominent in the throat region. The condition often terminates in immediate death. Forced driving of affected animals may prove fatal.

Early investigations of this disease were made in Colorado by Glover and Newsom between 1915 and 1917. They reported that cattle in Colorado had been affected for a long time by a disease characterized by a swelling of the brisket. They believed that these symptoms were caused by exertion of the heart before acclimatization to high elevation, or in calves by inherited cardiac weakness. Recent work by Jensen and Pierson indicates the disease in Colorado is due to high altitude and a resultant diseased condition of the lungs.

A similar disease called "St. George's disease" was reported from Australia by Maunder in 1947. This disease occurs at low altitudes and the cause is unknown although it is believed to be a toxic element in the diet or a dietary deficiency of one or more nutrients.

#### Studies With Trace Minerals

Earlier research in Utah was centered on the role of trace miner-

als. But the findings indicate that trace minerals probably are of little significance in altering the incidence of the disease or in curing it. Extensive blood studies on normal animals supplemented with trace minerals showed no advantage over animals not receiving mineral supplements. Furthermore, blood studies of affected animals have not revealed any apparent abnormal blood changes.

Information available indicates that brisket disease does not occur on all high elevation range areas. For this reason the plants on ranges where the disease is prevalent have been studied. These suspected plants are uncommon in areas where the disease does not occur. However, experimental findings indicate that the plants are not significant causative agents of brisket disease. Suspected plants are marsh marigold (*Calthaleptosepala* DC.), yellow flowered buttercup (*Ranunculus* sp.), and groundsel (*Senecio*).

Changes in the environment may alter the course of the disease. Confinement on high quality feeds, or removal into areas of lower altitudes with good quality feed will aid in recovery. The stage of the disease when the animal is found is the most significant single factor affecting the outcome of the animal. A small number of animals recover without treatment.

## CONTRIBUTIONS TO RESEARCH

May 15 to August 15, 1957

U. S. Steel Corporation  
Fertilizer Division

\$2500 for fertilizer tests

Utah Idaho Sugar Company

\$2000 for research on irrigation and soil fertility of sugar beet production

U. S. Smelting, Refining, and  
Mining Company

\$1200 for research on effect of minor elements on soil fertility

National Turkey Federation

\$1000 for studies on synovitis of turkeys

Stauffer Chemical Company

\$500 for insect pollination investigations on legumes



# CHRYSANTHEMUMS for the fall garden

OTTO RIETHMANN

Varieties tested for winter hardiness; earliness; tolerance of flowers and buds to early frost; wind and weather resistance; vigor; height; spread; number, size, type, and color of flowers

CHRYSANTHEMUMS are one of the most appreciated of ornamentals. No other perennials give the gardener so much variation in color and plant type during the fall after the blooming period of most other flowers has passed. At this time they produce flowers so abundantly and in such a variation of color and intensity that a garden with many chrysanthemums in bloom is like a finale to the summer beauty.

Chrysanthemums were cherished in England more than 120 years ago and reached our country about 20 years later. Today, the number of varieties available on the market has increased into the hundreds and every year new varieties are released. The outlook for the future is encouraging and even though varieties are already highly devel-

oped, more perfection in color, form, and size of flowers combined with earliness and hardiness will be achieved.

Like other composite flowers, interesting variations have developed from the common single daisy type to all gradations of doubling along with many variations in shape and size of the individual florets.

The following list gives a summary of the different types:

Single	Incurves
Semi-double	Reflexed
Anemone	Spoons

○

OTTO RIETHMANN has charge of the research and teaching in floriculture. The experimental gardens on Highway 89 in north Farmington where the research in floriculture is conducted are a constant delight to the flower lover throughout the growing season and well worth an hour's visit or a special trip to see.

Pompon	Thread
Button	Spiders
Decorative	

## A Good Chrysanthemum Variety

**Winter hardiness:** In our climate winter hardiness is important. In order for a variety to be suitable for this area it should have resistance to winter cold as well as to the freezing and thawing of early spring.

**Earliness:** Many people are disappointed because their chysanthemums bloom too late and often freeze before the buds have a chance to open. Such chrysanthemums are often just as worthless as those which lack winter-hardiness. Chysanthemums may be grouped according to their blooming period as follows:



Moonbeam



Tranquility



Chrysanthemums  
growing in the experi-  
mental gardens at Farmington

1. Very early (Begin to bloom in August)
2. Early (Begins to bloom between the middle and end of September)
3. Medium early (Begin to bloom the first of October)
4. Medium late (Begin to bloom between the first and second week in October)

5. Late (Varieties begin to bloom after the middle of October)

It is important to select varieties with the blooming date before the average date of the first killing frost. This may require very early and early varieties in the higher elevations.

It often happens that warm weather will follow an early and sudden cold spell which may kill most garden flowers. The mature  
(Continued on page 74)

Lee Povel



Apache





The four pictures show the present mid-summer size and condition of average peach trees pruned by the four methods discussed. The trees in the pictures are

the same scale so differences in size are accurately shown. (1) A tree pruned by the corrective method. Note the ungainly spread. (2) A tree pruned by the thinning

out method. The top is not dense and sunlight penetrates down to the center of the tree where the fruit is produced. (3) A conventionally pruned tree. Note the



# THINNING-OUT METHOD

## Best Type of Pruning for Peach Trees

ROBERT K. GERBER

TESTS over a period of 8 years continue to show that peach trees pruned by the thinning out method produce more marketable fruit than trees pruned by other methods. Two previous reports in Farm and Home Science, the last one in 1952, pointed out this conclusion. Five more years of data as the trees approach their peak of production support the earlier conclusion.

### Yields of Fruit

Over the 8 year period, total yield of fruit increased as the severity of the pruning decreased. The average yearly yield per tree increased from 2.60 bushels to 4.88 bushels as the pruning changed from severe to corrective (fig. 7). However, yield of marketable fruit (2½ inches in diameter and larger) was highest on trees pruned by the thinning-out method. Thirty-eight percent of the fruits produced on correctively pruned trees were unmarketable while only 16 percent of those produced on trees pruned by the thinning-out method were

PRUNING METHODS TESTED	
(1)	<b>CORRECTIVE</b> —only dead, diseased, injured, and interfering branches are removed each spring. For the first five years, this was essentially a "no pruning" method.
(2)	<b>THINNING-OUT</b> —all the weak new branches plus enough vigorous ones to make 35 to 75 percent of the total new wood are removed. At about 9 feet in the air, the scaffold branches are headed to outside laterals.
(3)	<b>CONVENTIONAL</b> —a few cuts of large branches are made to thin out the top. Enough extra wood, especially weak twigs, is cut out to reduce the total 35 to 75 percent.
(4)	<b>SEVERE</b> —all of the weak twigs plus enough vigorous ones to make 50 to 75 percent of the total are removed. Those twigs remaining are headed back to 4 to 6 inches.

of this quality. The trends in the yield of marketable fruits produced by the different methods of pruning are shown in fig. 8.

### Thinning

With the first three methods of pruning, the fruit was thinned soon after the June drop. Enough fruits were left to size up properly — about 1200 fruits to the mature tree. On the severely pruned trees, no fruits were thinned off. Horticulturists recommending this method have assumed that the extra pruning would take care of the thinning problems. However, some small

fruits were produced in the clusters of unthinned peaches.

### Size and Condition of Trees

Trees pruned by the corrective method now after 13 years of growth average 4849 cubic feet in volume and are crowding each other. Trees pruned by the thinning-out method average 2145 cubic feet and just fill the space between trees. Conventionally pruned trees cover about 1437 cubic feet with some space between trees. Severely pruned trees occupy only 905 cubic feet of space, so are not using all the land. Trees pruned by this method could be planted 150 to the acre instead of the standard 100 trees. If the conventional system is regarded as standard, se-

ROBERT K. GERBER is assistant professor of horticulture. He has worked on the pruning project since it was started.



relatively dense top. There are few healthy branches in the center of the tree. (4) A severely pruned tree. Irregularly sized fruits are shaded by the vigorous vegetative growth



verely pruned trees are 37 percent smaller, while trees pruned by the thinning-out method and by the corrective method are 49 and 237 percent larger, respectively.

Trees pruned by the corrective method are spreading and ungainly (fig. 1). The lower limbs touch the ground while the upper ones are so high it is difficult to pick the fruit. Fruits ripen 3 to 4 days earlier than those on trees pruned by the thinning out and conventional methods. The long bare scaffold branches produced by this type of pruning are shown in fig. 5. The stubs of severely split branches produced by heavy crops on one trees are shown in fig. 6. Half the scaffold branches have been cut out.

In the thinning out method of pruning, the top of the tree is not dense and sunlight penetrates down to the center of the tree where some of the fruit is produced (fig. 2).

The conventionally pruned tree has a relatively dense top (fig. 3). The fruits are produced in this area with few healthy branches or fruit in the center of the tree.

The dense head with vigorous vegetative growth of the typical severely pruned tree is shown in fig. 4. The clusters of irregularly sized fruits are shaded by these shoots. At harvest time, these fruits are easily picked, but they ripen 3 to 4 days after the fruit of trees pruned by other methods. Most

(Continued on page 73)



Fig. 5. The bare scaffold branches produced by the corrective system of pruning



Fig. 6. Tree pruned by the corrective method. Note the stubs of severed split branches produced by heavy crops

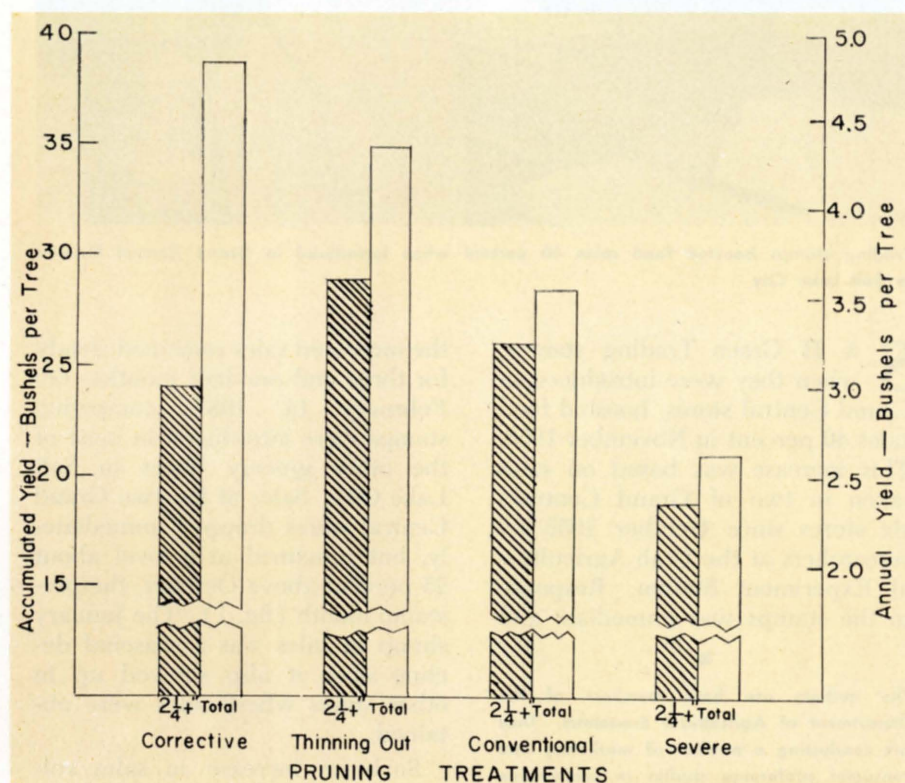


Fig. 7. Total yields and average yields of marketable fruit produced with the various methods of pruning



# Trading Stamps Boost Sales in Retail Food Stores



Trading stamps boosted food sales 40 percent when introduced in Grand Central Markets in Salt Lake City

**S** & H Green Trading stamps, when they were introduced in Grand Central stores, boosted food sales 40 percent in November 1956. This increase was based on sales taken in two of Grand Central's six stores since October 1956 by researchers at the Utah Agricultural Experiment Station. Response to the stamps was immediate and

The authors are both members of the Department of Agricultural Economics. They are conducting a number of marketing and consumer preference studies in cooperation with the Grand Central Markets in Salt Lake City

the increased sales remained steady for three and one-half months. On February 14, 1957, competing stamps were introduced in most of the other grocery stores in Salt Lake City. Sales at the two Grand Central stores dropped immediately, but remained at a level about 25 percent above October, the pre-stamp month (fig. 1). The January slump in sales was a seasonal decline since it also showed up in other stores where sales were obtained.

Such an increase in sales volume from trading stamps cannot be expected under all conditions.

R. H. ANDERSON  
E. W. LAMBORN

Other studies have shown that increases in sales attributed to use of trading stamps have ranged from little or none to 100 percent or more. The degree of increase varies with kind of store, other promotional practices, and competitive practices of other nearby stores.

Conditions which prevailed in the Salt Lake City market should be important in deciding to what extent the use of trading stamps could be duplicated in other markets. Prior to their introduction by Grand Central Markets, stamps were available in the Salt Lake market, but only at smaller scattered grocery stores and other types of businesses. None of the grocery chains, national, regional, or local, were using stamps. These chains were considered by shoppers to be low-priced stores compared with small neighborhood grocery stores. Many shoppers used the outlets where they could get stamps in purchasing products such as gasoline, where the price of the product could be easily compared. They were more reluctant to purchase all of their food at small grocery stores where prices were relatively high and choice of products was limited.

When Grand Central introduced trading stamps in their six supermarkets, shoppers had the advantage of wide selection and low prices as well as the trading stamps. The timing was favorable since trading stamps were sufficiently prevalent in the Salt Lake market to acquaint shoppers with their use



and possibilities. The premiums available and outlets where stamps could be redeemed were well-known.

#### Where Did the Increase in Sales Come From?

The immediate increase in sales at Grand Central stores came at the expense of competing grocery stores. Demand for food is inelastic. Actually the increase of 40 percent in sales did not come entirely by a shift of new customers to these stores. Part of the increase resulted from larger sales per customer. This means that shoppers who previously divided their purchases among several stores now bought more from one store in order to take advantage of trading stamps.

Cash register readings, the first two or three weeks after stamps were introduced, showed number of customers up 50 percent in one of the stores studied and 35 percent in the other. In succeeding weeks, the number of customers per week

declined gradually, but by January one store had 15 percent more customers than before introducing stamps. The other had 5 percent more. Gold Strike stamps, introduced in other stores in February, had no measureable effect on the customer count in these two Grand Central stores.

A store-door consumer survey at the two stores in December showed an increase in number of customers. Of 1,958 customers interviewed, who purchased most of their groceries at the two Grand Central stores, 10 percent admitted having changed to these stores as a major source of groceries within the previous two months. Of those who changed, almost 60 percent gave trading stamps as the reason for changing.

Sales per customer in one of the stores climbed gradually for three months and reached a peak 30 percent above the pre-stamp level. After competing stores introduced Gold Strike stamps, Grand Central's

sales per customer declined; however, by March and April sales per customer in this store were still about 15 to 20 percent above the pre-stamp level. In the other store, the sales per customer increased 17 percent and then declined to 5 percent above the pre-stamp level.

By coincidence, the sales increase due to trading stamps was the same for the two stores; 23 percent by March, 26 percent by July. One obtained its increase largely from more customers and the other from larger sales per customer. As of March 1957 one of the stores had 15 percent more customers and 5 percent larger sales per customer than during the pre-stamp level. The other store had 5 percent more customers, but 20 percent larger sales per customer.

#### Effect of Trading Stamps on Costs and Prices

Whether grocers have to raise prices when they give away trading stamps depends primarily on what happens to sales. Some costs of retailing, such as rent, heat, and light, are about constant regardless of volume of sales. Other costs, such as labor and interest, increase with volume of sales.

Trading stamps do increase costs. The retailer must pay for the stamps. A common price is \$2.50 to \$3.00 per thousand, or  $\frac{1}{4}$  to  $\frac{1}{2}$  of a cent per stamp. The usual practice is to give one stamp for each 10 cents of purchases which would result in a cost increase of  $2\frac{1}{2}$  to 3 percent of sales. If the stamp plan results in a sufficient gain in sales, as was true in the case studied, the retailer's cost in percent of sales may not increase. This is because his overhead cost may be spread over more volume. Under these circumstances the retailer may actually boost his profits and keep his prices down.

A competing retailer faced with lower volume as a result of competition from trading stamps would have several alternatives open to him:

1. Go along and let his profits
- (Continued on page 71)

#### Relative Sales

Oct. = 100

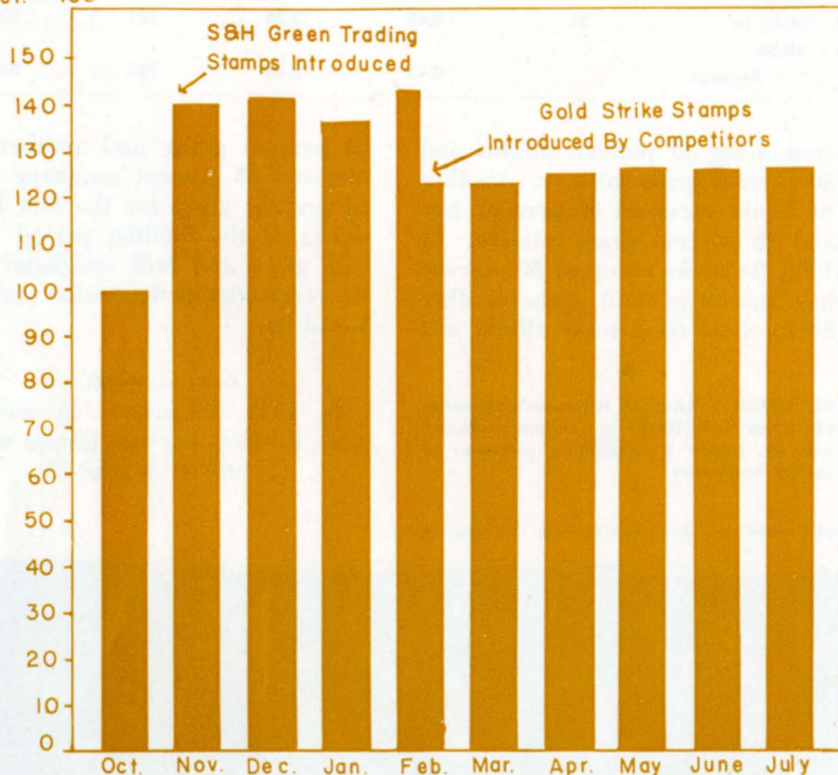


Fig. 1. Sales at two Grand Central Markets in Salt Lake City before (October) and after the introduction of trading stamps, October 1956 to July 1957



# Roughage in Rations of Feeder Lambs

Lambs gain efficiently when ration is pelleted.  
Economy depends on cost of pelleting

ROBERT J. RALEIGH, JOHN E. BUTCHER, and LORIN E. HARRIS

LAMBS being fattened for market will gain efficiently on high levels of roughage if the entire ration is pelleted. With the usual differential between the price of alfalfa and grain, feeding high roughage should mean a saving to the feeder. However, at the present time in most areas the high cost of grinding the roughage and pelleting the entire ration may greatly lower the price differential.

## Feeding Tests

Researchers at the Utah Agricultural Experiment Station conducted feeding trials in 1955 and 1956 to determine the ration of roughage to grain which would produce the fastest, most economical gains on fattening lambs. The grain mixture fed had the following percentage composition:

barley 53  
wheat 20  
molasses dried beet pulp 20  
omalass 5  
salt 1  
dicalcium phosphate 1

The entire ration, including the roughage (alfalfa hay) was made into three-fourths inch diameter pellets  $\frac{1}{2}$  to 1 inch in length.

In 1955, 36 white faced weanling wether lambs were fed a ration

Table 1. Average daily gain, daily feed intake, feed required per 100 pounds of body weight gain, and dressing percent of 72 lambs on a 70-day fattening period in 1955

Ratio of roughage to grain	Number of lambs	Daily gain	Daily feed intake	Feed per 100 lbs. gain	Dressing percent
		pounds	pounds	pounds	
50:50	36	0.40	3.60	897	52.1
60:40	36	0.37	3.48	930	52.4
Average		0.38	3.54	913	52.2

Table 2. Average daily gain, daily feed intake, feed required per 100 pounds of body weight gain and dressing percent of 72 lambs on an 84 day fattening period in 1956

Ratio of roughage to grain	Number of lambs	Daily gain	Daily feed intake	Feed per 100 lbs. gain	Dressing percent
		pounds	pounds	pounds	
50:50	24	0.38	3.05	803	50.3
65:35	24	0.46	3.37	733	52.1
65:35 to 50:50	24	0.45	3.29	731	52.6
Average		0.43	3.24	753	51.9

containing 50 percent alfalfa and 50 percent grain mixture. Another 36 lambs received 60 percent hay and 40 percent grain mixture. In 1956, 24 lambs received 50 percent hay and 50 percent grain, another 24 received 65 percent alfalfa and

35 percent grain, and another 24 received 65 percent roughage and 35 percent grain for the first four weeks of the feeding period and half grain and half roughage for the remainder of the period (tables 1 and 2).

## Gains in Weight

In 1955 differences in weight gains between the two groups were  
(Continued on page 72)

DR. ROBERT J. RALEIGH is research associate, DR. JOHN E. BUTCHER is assistant professor, and DR. LORIN E. HARRIS is professor of animal husbandry.

Lambs used in the experimental feeding tests





Decision to fatten lambs  
should be based on  
knowledge of costs



## *Profits From Feeder Lambs*



LYNN H. DAVIS

As the autumn season approaches lamb feeders are confronted with the problem of whether or not to fatten lambs during the winter. Their decision should be influenced by anticipated costs and returns and based on a knowledge of the physical requirements and outputs of lamb fattening. They also need to know current prices of feeder lambs, feeds, and other required items as well as anticipated prices of fat lambs at the time of sale to determine the pos-

sible profit or loss for a particular feeding year.

A research study conducted by the Utah Agricultural Experiment Station in cooperation with 36 lamb feeders during the 1954-55 feeding year in Utah gives information that feeders can use as a guide in making their decision. In this study physical requirements and costs and returns were determined for each fattening operation by examining enterprise record books. Each operator was contacted by a representative of the Experiment Station and the weekly record of the amount and kind of feeds fed, time, and other items used. At the end of the fattening period the record books were checked and summar-

ized to give averages for lamb fattening in Utah.

The average lamb fattening operation consisted of 1065 lambs fed for 101 days—44 days on pasture and 57 days in drylot. During the feeding period the lambs gained about 25 pounds at an average rate of .25 pound per day. They averaged 100 pounds when sold. Total receipts, which included home use of lamb, manure credits, and wool and pelt sales, were \$19.34 per lamb. Net return per head averaged 68 cents.

LYNN H. DAVIS is assistant professor of agricultural economics. His special interest is livestock marketing. Further details of this study are given in Station bulletin 397, Costs and returns from lamb fattening in Utah.

Average Requirements and Costs of Fattening,  
1954-55

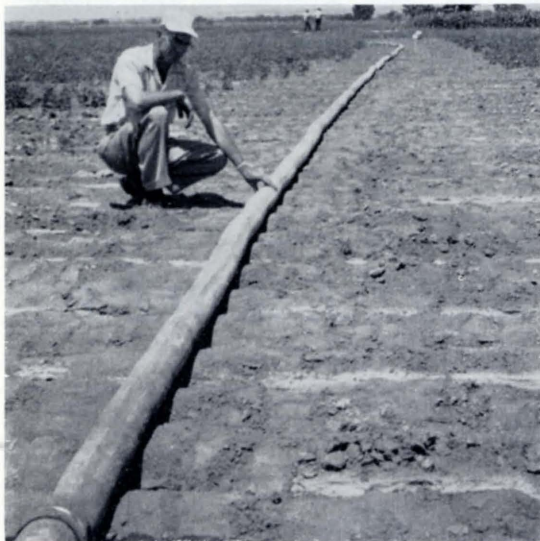
The following averages do not  
(Continued on page 70)



Butyl coated nylon tubing is supplied in 50-foot lengths with a built-in coupler and

is available in 4, 6, 8, 10, 12 and 16-inch round diameters. Some 4-inch tubing is

under test at the experimental farm in Farmington. (1) A section of the transmis-



Left, intake structure and connector for lay-flat tubing. The tubing shown is a vinyl rayon laminate and has a 37-inch round diameter. It is designed to carry 20 cubic feet per second with a head loss of .001 feet per foot. Right, vinyl dipped nylon tubing 37 inch round diameter operating at about one fourth capacity

### C. W. LAURITZEN

TESTS with lay-flat tubing for conveying and distributing water were begun at Logan about ten years ago. The name, lay-flat, is used to designate a tubing which lies flat when empty. Materials used in the construction of this tubing have included canvas, supported and unsupported plastic fabrics, and now butyl. When used to convey water, lay-flat tubing assumes a rounded shape, the degree

## LAY-FLAT TUBING

### *A promising irrigation development*

of roundness depending on the internal pressure. A hydrostatic head of about four pipe diameters is necessary to give the tubing a fully round cross section.

Most of the tubings on the market have not been entirely satisfactory; and because of this, lay-flat tubing has not been used extensively for conveying and distributing irrigation water. The two factors primarily responsible for this slow acceptance have been the poor durability and the lack of convenient coupling and diversion devices. Better durability of polyethylene and vinyl film has been achieved through the addition of pigments and the use of different plasticizers, antioxidants, and sterilants in the case of vinyl. Recently, a method was devised for what appears to

be good polyethylene nylon laminate, and a lay-flat tubing fabricated from butyl is now commercially available.

#### Tests on Butyl at Logan

The tests on butyl at Logan constitute the first research with this material for irrigation use. The results of some of this early work are reported in Experiment Station Bulletin 363, entitled "Butyl fabrics as canal lining material." A brief note on the durability of butyl linings was reported in the last issue of Farm and Home Science.

Our studies indicate that butyl is extremely durable and lay-flat tubing fabricated from butyl should give good service. Butyl is a synthetic rubber, the same material from which inner tubes are made. Characteristic of rubber is its ability to stretch and its recovery properties. Unsupported butyl sheeting can be used successfully for conveying water at low pressures. If tubing is to be used for conveying

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sion line. (2) Shows how the line can be bent. (3) A spiled section coupled to the

main transmission line. (4) End cap coupled and in place. Spile is bent to reduce

discharge from spile. (5) Spiled section distributing water to furrows in tomatoes



water at high pressures, it will be necessary to have a supported structure, whether the tubing is of the butyl, vinyl, or polyethylene type. Many kinds of supporting fabrics may be used. One of the best of these, because of its high strength, is nylon. Another that has possibilities is fiberglass. Both of these, together with several other types of materials, have been used in the fabrication of experimental structures. Supporting materials, such as nylon, in addition to increasing the strength of the structure, increase its resistance to snagging and abrasion.

#### Permissible Pressures

Permissible pressures in lay-flat tubing constructed of the same fabric will vary with the diameter. A higher pressure is permissible in small diameter tubing than in larger diameter tubing of the same material. Nylon reinforced butyl tubing or flexible pipe, as it is referred to by the manufacturer, in the four inch size will withstand pressures of approximately 50 pounds per square inch. Permissible pressure in tubing of this same material in the 16 inch diameter size is approximately 10 pounds per square inch. The strength which should be built into a fabric for

use in lay-flat tubing will depend upon the use to be made of it.

Where the tubing is to be used to convey and distribute water at low heads, great strength will not be required. Under these conditions, it will be necessary only to build sufficient strength into the tubing to allow it to be handled without damage from snagging and abrasion. On the other hand, if the tubing is to be employed to convey water under high pressures, it will be necessary to construct it from high strength materials.

In the interest of economy it is desirable that the strength of the tubing material be kept as low as possible consistent with the intended use. It may be practical, for example, to employ a low strength material, if the tubing is used in a canal or ditch of a size such that there would be little stress on the material itself, with the tubing well supported by the invert of the canal. If used in this way, the tubing would act primarily as a lining for the canal but would have some other advantages. It would prevent seepage, and at the same time control evaporation and aquatic weed growth. Where sufficiently strong to withstand the additional stresses imposed, the tubing need not be laid on grade but may be used

to carry water over uneven topography.

#### Diversion Devices

Spiles are frequently built into sections of lay-flat tubing to divert the water into the furrow or onto the land. Tubing is available having spiles of various sizes and spacings. Tubing has been manufactured commercially in which the outlets or openings for the water consist of holes in the pipe without any spiles. Generally speaking, these are not as satisfactory as spiles.

Improvements are needed in the design of diversion structures of all present tubing. A regulating device to give positive control of the amount of water discharging at any one point is needed. The general requirements of such devices are known, and eventually will be developed. Where spiled tubing is used, the water can be controlled, if the pressures are low, merely by changing the bend in the spile—that is, adjusting the position to kink the spile either more sharply or less sharply. Where high pressures are used, this type of control is not possible.

The only built-in coupling device in use, so far as is known, is one used on the recently manufactured butyl tubing. This is an improve-



ment over the metal sleeves commonly used, but is more cumbersome than the coupling devices on aluminum pipe on sprinkler laterals.

#### Use in Sprinkler Irrigation

There is a possibility that lay-flat tubing eventually may be used as a substitute for aluminum pipe in laterals, or even main lines, in sprinkling systems. In this event, high strength material would have

to be used. There are some advantages to the use of lay-flat tubing for sprinkler laterals. If moved by reeling, they would save labor. Much work, however, remains to be done before such possibilities become practical. The durability and design of lay-flat tubing are being improved and it is anticipated that the day will come when it will be extensively used by the irrigator.

## PROFITS FROM FEEDER LAMBS

(Continued from page 67)

represent any one fattening operation perfectly. The individual operator should adjust them to fit his particular situation.

Cost of feeder lambs was the largest single cost. It accounted for about 70 percent of total cost (table 1). The feeder lambs averaged about 76 pounds when purchased and cost \$12.98 per head.

Other costs, in order of their importance, were feed 22.2 percent, labor 3.2 percent, overhead 3.1 percent, material 1.3 percent, and power .6 percent.

Feed costs averaged \$4.15 per lamb (table 2). This charge represents the market value of all feed offered to the lambs. Feed wastage was not measured. About 40 percent of feed cost was accounted for by concentrate feeds. The balance was for roughage, pasture, and miscellaneous feed items. About 22 percent was for pasturage.

Table 1. Costs of fattening lambs, Utah, 1954-55

Item of cost	Cost per head*		Percent of total
	dollars	percent	
Lambs	12.98	69.6	
Feed	4.15	22.2	
Labor	.59	3.2	
Overhead	.58	3.1	
Material	.25	1.3	
Power	.11	.6	
Total	18.66	100.0	

\*Costs per head are based on the number of lambs sold and used at home.

Table 3. Estimated costs of fattening lambs, Utah, 1957-58

Item of cost	Cost per head*		Percent of total
	dollars	percent	
Lamb	13.88	72.0	
Feed	3.76	19.5	
Labor	.65	3.4	
Overhead	.62	3.2	
Material	.26	1.3	
Power	.12	.6	
Total	19.29	100.0	

\*Costs per head are based on the number of lambs sold and used at home.

son. When hired labor was used lamb fattening helped provide year round employment for hired men.

Use of pens and equipment to care for lambs and money to finance feeding operations represent a cost to lamb fattening operations. They are commonly known as overhead costs. The amount charged should be determined by the amount of use. Overhead cost per head ranged from 40 cents to more than \$1 with an average of 58 cents per head. Interest on operating capital and capital investment averaged 43 cents and 5 cents, respectively. The remaining 10 cents per head was charged for depreciation, repairs, and taxes.

Bedding, buying and selling commissions, veterinary services, medicine, water, and miscellaneous costs were grouped together as material costs. These averaged about 25 cents per head. Bedding accounted for 10 cents per head and buying commission averaged 4 cents per head for all lambs. Items

The most common drylot ration consisted largely of barley and alfalfa with some dry sugar-beet pulp. In some rations wheat, corn, and oats were fed as part of the grain ration. A variety of other feeds were used when available at reasonable cost. They included corn silage, wet beet pulp, beet molasses, orange pulp, alfalfa seed chaff, protein supplements, vitamins, and minerals. The actual combination of ingredients in the ration should depend on prices of various feeds in relation to their feeding values.

Labor accounted for about 3 percent of total costs. About ½ hour per lamb was required on the average and cost 59 cents. In most cases labor was provided by the feedlot operator and his family. Lambs are usually fed during the autumn and winter seasons when the demands for labor for other farm operations are not as great as during the summer growing sea-

Table 2. Average amount and cost of feed per head required to fatten lambs, Utah, 1954-55

Kind of feed	Unit	Per head			Percent of feed cost
		Amount	Price per unit	Total cost	
			dollars	dollars	percent
Grain	pound	51,200	.027	1.39	33.6
Alfalfa	pound	120.000	.012	1.40	33.8
Pasture	day	45.000	.020	.90	21.7
Dry beet pulp	pound	6.090	.023	.14	3.4
Other feeds	pound	83.7	.004	.32	7.5
Total		---	---	4.15	100.0



of cost such as commissions were not incurred on all lambs so the average is lower than the actual commission fee per head charged. Power costs averaged 11 cents per head.

#### Requirements and Costs of Fattening, 1957-58

The following analysis is made to show the way the above averages can be used when deciding whether or not to fatten lambs this year. We can assume about the same physical requirements for lamb fattening in 1957-58 as in 1954-55. Prices have changed, however, and should be adjusted to current levels. This can be done by the operator who is acquainted with the situation in his area.

The estimated total cost of fattening lambs based on June 1957 price reports and cost indexes is \$19.29, including the cost of the feeder lamb (table 3). Feed costs are lower this year but all other costs including feeder lambs are higher. These price relations reflect better range conditions and above average feed supplies in 1957. Cost per hundredweight of gain is about \$1.10 lower than in 1954-55, because feed cost is an important item

of cost and the cost of the lamb does not enter into this calculation.

The information in table 3 indicates that lamb feeders can do the following:

1. Buy a 75 pound feeder lamb at 18.50 per cwt costing .....\$13.88
2. In 101 days put on 25 pounds of gain at a cost of ..... 5.41
3. To break even feeders will have to sell 100 pounds of lamb for .....\$19.29

To cover all costs lamb feeders would have to sell fat lambs for 79 cents per hundredweight more than they paid for feeder lambs. It should be remembered that this assumes average conditions. Lamb feeders who are better than average can cover costs with less spread in price. On the other hand, below average feeders will need a wider price spread. At present the slaughter lamb prices are enough higher than feeder lamb prices to make lamb feeding profitable. Lamb feeders should, however, watch market conditions because as the time approaches for feeder lambs to be marketed the margin can be predicted with more accuracy.

#### TRADING STAMPS

(Continued from page 65)

decline as his sales volume declines.

2. Attempt to maintain his profits by raising his prices.
3. Introduce competing stamps or other promotional devices in an attempt to maintain sales volume.

The pressure for increased prices is greater for the grocer who loses sales because of trading stamps in other stores than it is for the grocer who introduces the stamps. This is particularly true if the giving of stamps results in a substantial increase in sales.

#### Ethics of Trading Stamps

Trading stamps are a promotion-

al device for attracting and holding customers. As such, they should come under the same scrutiny as any other promotional device.

As long as the number of stamps per dollar purchase is pre-announced and the redemption value of the stamps is pre-determined there seems to be nothing fraudulent about the use of trading stamps. The choice of the shopper is not interfered with in any way and no exaggerated claims are made which are deceiving to the shopper. If effectiveness of stamps in accomplishing the objectives for which they are used is the only indictment against them, there seems to be no reason for passing laws against their use.

#### VOLUNTARY ORGANIZATIONS

(Continued from page 57)

Baseball team  
Softball team  
Bowling team  
Riding group  
Western Sportsman Association  
Chamber of Commerce  
Junior Chamber of Commerce  
Kiwanis  
20-30 Club  
American Legion  
Daughters of Utah Pioneers  
Parent-Teachers Association  
Beta Sigma Pi  
Boy Scouts or Girl Scouts (adult leaders' organization)  
4-H Club (adult leaders' organization)  
Labor union  
Farmers co-op  
Farm Bureau  
Davis County Wild Life Federation  
Dairymen's Association

The present analysis has posed four questions.

1. How many people in Clearfield participate in each of the five types of organizations?
2. How do men and women differ in their participation?
3. How do men and women of different religious faiths differ in their participation?
4. How do the "active and inactive" church members compare in their participation in secular (non-church) organizations?

#### How the Facts were Gathered

To answer these and other questions, every fourth householder on every street in Clearfield was interviewed, yielding a sample of 349 households. As late as 1940, Clearfield was a rural village of only 1,053 people; by 1950, the population had soared to 4,723, an increase of 348 percent. Clearfield was the second town in Davis County in the percentage increase of population between 1940 and 1950, and Davis County had the highest percentage population increase in the state. Some of the people who migrated to Clearfield were from out-of-state, but about seven out of ten residents at the time of the interview were Utahns in the sense that they had always lived in Utah or had lived here



for an extended period in their youth.

#### Differences in Participation

People in Clearfield, like people in other parts of rural or small town America where studies have been made, participate most actively in church organizations. Only 13 adults in the sample do not belong to any church. On the other hand, 654 are church members. However, being a church member does not necessarily mean that the person will take part in church activities. Though practically all sample members are church members, only 65 percent take part in church activities to the extent of attending one or more meetings a year.

These figures for church participation are high when compared to participation in secular organizations. Only 48 percent of our sample belongs to secular organizations and only 42 percent actually take part.

Secular participation is pictured more vividly when type of organization is examined. Social organizations are the most popular. Thirty-one percent of all people in the sample belong to a social organization. Educational organizations come next, with 18 percent of the sample belonging, while civic organizations claim 13 percent.

#### Differences between Men and Women

How do men and women differ in their participation? Of the 13 people who have no religious membership, 8 are men and 5 are women. Of the 654 church members, 323 are men and 331 are women.

In secular organizations, men tend to exceed women. Of the men 55 percent are members, while 43 percent of the women are members, a statistically significant difference. Differences between men and women are more evident when the type of organization is considered. Of the women, 29 percent have membership in social organizations. For the men this is 34 percent. Though these percentages are not signifi-

cantly different in a statistical sense, this finding questions the traditional notion that it is the women who are the "club" conscious element of the adult population. Twenty-two percent of the women are in educational organizations (mainly the Parent-Teacher Association), while only 14 percent of the men are so affiliated. Only 5 percent of the women are in civic organizations, while 22 percent of the men have such memberships. These differences are significant statistically.

#### Differences between Religious Groups

How do members of the Latter-day Saint and non Latter-day Saint churches differ in participation? Of the 654 members, 428 or 65 percent are L.D.S. and 226 or 35 percent are non-L.D.S. Our data show that participation in church organizations differs among the L.D.S. and the non-L.D.S. groups. However, sufficient interpretative data have not yet been obtained to make a scientific statement about these differences.

In determining whether L.D.S. members have a larger or a smaller percent of participation in secular organizations than members of non-L.D.S. churches, we found that 47 percent of the L.D.S. and 51 percent of the non-L.D.S. are affiliated with secular organizations, but this difference is not statistically signi-

ficant. Tests of difference between L.D.S. and non-L.D.S. members in extent of affiliation in each type of secular organization, likewise, show no significant differences even though a slightly larger percentage of the non-L.D.S. males take part in both social and educational organizations, and a slightly larger percent of the L.D.S. males take part in civic organizations.

Differences in secular affiliation between the L.D.S. and non-L.D.S. females are likewise slight, with the exception of educational organizations. A significantly higher percent of L.D.S. women is affiliated in educational organizations.

#### Active and Inactive Church People

Do those who take part in church organizations also take part in secular organizations? The findings show that taking part in church organizations tends to be associated in a statistically significant way with taking part in secular organizations. Sixty-one percent of the males who take part in church also take part in secular organizations, while only 44 percent of the males who do not take part in church take part in secular organizations. Of the women, 48 percent who take part in church also take part in secular organizations as compared to only 31 percent for those who do not take part in church.

## ROUGHAGE IN LAMB RATINGS

(Continued from page 66)

not significant (table 1). In 1956, the average daily gain of all lambs was .43 pounds (table 2). The group receiving equal parts grain and roughage gained less (.38 pounds daily gain) than the lambs on 35 percent grain (.46 pounds daily gain).

#### Feed Consumption

In 1955, the average daily feed consumption was 3.60 for lambs fed 50 percent grain and 3.48 pounds for those fed 40 percent. In 1956, the groups consumed 3.05,

3.37, and 3.29 pounds of feed for those fed 50 percent grain, 35 percent grain, and those fed 35 percent the first part of the period and 50 percent later, respectively.

#### Feed Efficiency, Dressing Percentage, Carcass Grade

The lambs fed in 1955 showed no significant differences in feed efficiency, dressing percentages, or carcass grade. Two of the carcasses graded prime, 60 choice, and the others good. In 1956, the lambs receiving 50 percent grain required



803 pounds of feed per 100 pounds of gain as compared to 733 and 731 pounds for those fed 35 percent grain during the entire period and for those fed 35 percent during the first half of the feeding period

and 50 percent during the latter. Dressing percentage and market grades were not significantly affected by amount of grain fed. Thirty-four carcasses graded choice, 34 good, and 4 utility.

## PRUNING STUDIES

(Continued from page 63)

of the fruits are large, soft, and poorly colored. There are a few small misshapen fruits in the clusters caused by the intense competition and the crowding.

During the life of the experiment, leading peach growers and county

agricultural agents have visited the Howell Field Station on Peach Field Days and have seen the trees in the pruning experiment. Many growers, especially in Utah County, have already adopted the thinning-out method.

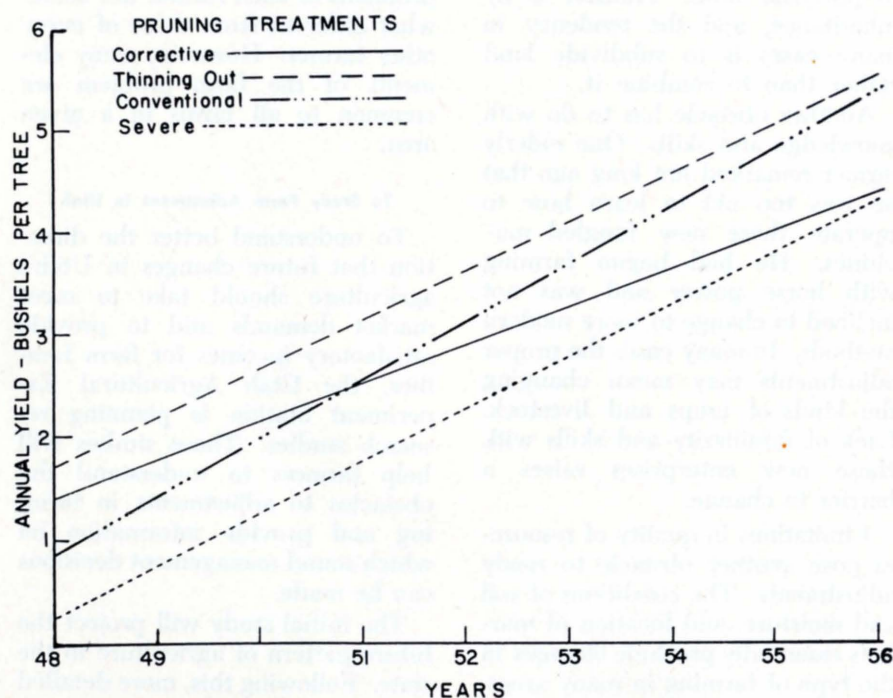


Fig. 8. Trends in the yield of marketable fruit produced on trees pruned by various methods over an eight year period

## ECONOMIC CHANGES

(Continued from page 56)

as greater knowledge is made available, and is used more widely.

Even more phenomenal is the change in the output of agricultural products per man hour of farm labor. The rapidity of these changes may be emphasized by the fact that from 1910 to 1940 the output per man hour of farm labor increased 50 percent, while from 1940

to 1956 the output has doubled. This is the result of increased rates of production per acre and per unit of livestock and of more mechanical power.

### Changes in Total Farm Output and Population

Since 1940 total farm output has increased 36 percent. Over the

same period of time population in the United States has increased 27 percent. The differential in the rate of increase, adjusted for changes in exports and imports, accounts in large measure for the surpluses that have accumulated in many major farm commodities.

### Changes in Production Capital Requirements

Because of changes in output per hour of farm labor, substantial changes have also occurred in the number of farms, farm population, and the place of employment of people living on farms. From 1910 to 1940 there was relatively little change in the total number of farms reported by the Bureau of the Census. The maximum number, 6,812,000, was reported in 1935. Since then the trend has been consistently downward. In 1940, 6,097,000 were reported; in 1950, 5,382,000; and in 1954, 4,782,000. This represents a decrease of more than 2 million farms, almost 1/3 of all farms from 1935 to 1955.

Similar decreases have taken place in the total farm population: 1940—30,840,000; 1954—21,890,000. The proportion of the population living on farms is declining more rapidly than the farm population. In 1954 the Bureau of Census estimated 13.5 percent of the total population living on farms; whereas, in 1940 it was 23.2 percent.

In addition to these changes, a great change is taking place in the kind and place of employment of people living on farms. The Bureau of Census estimates that only two-thirds of the total employed male workers living on farms in 1956 were employed in agriculture. The other third was employed in non-agricultural industries. In 1950, 75 percent or  $\frac{3}{4}$  was employed in agriculture and  $\frac{1}{4}$  in non-agricultural industries. Comparable statistics are not available for earlier periods, but observation indicates that the trend toward farm people working in non-agricultural industries is becoming progressively more prevalent.



#### Changes in Production Capital Requirements

As shown above, the total labor required to produce food and fiber requirements of the domestic and foreign markets has been greatly reduced although the farm output has increased. This has been accomplished by substituting capital for man labor. The capital invested in machinery is of greatest importance as it affects labor requirements. In 1940 the average investment in farm machinery per worker was \$362 as measured in 1947-49 dollars. By 1956 this had increased to \$1,311, an increase of 262 percent. The increase has been most pronounced in tractors, motor trucks, grain combines, corn pickers, milking machines, pickup balers, and other forms of harvesting equipment. With mechanization, it is possible for each operator to farm larger acreages. Again measured in constant dollars, the value of real estate operated per worker increased approximately 60 percent.

The total acreage of cropland harvested in 1956 was less than in 1940. Although the acreage harvested has fluctuated with general economic conditions, there has been no definite trend since 1920.

Operating capital required for fertilizer, seeds, and insecticides has increased. The amount of plant nutrients used by American farmers increased by more than 250 percent between 1940 and 1956.

#### Obstacles to Adjustments in Farming

Adjustments in the organization and operation of farms to meet the changes in markets and the technological aspects of farm production referred to above often involve difficult decisions. Perhaps one of the major ones has to do with capital requirements. To adjust farming to the new trends requires double the investment in constant dollars. In current dollars, because of inflation, it is almost five times as large as in 1940. Many older farmers are hesitant to assume the risk of borrowing even though credit is available.

Inherent in the nature of agricul-

ture is long-time investments in specialized buildings and machinery. Major changes in type or methods of farming often mean scraping these investments long before they are worn out, while additional investments need be made if changes are made.

The availability of more land is often a major obstacle. Each farmer now needs additional acreage in order to operate effectively. Land ownership patterns tend to be fixed, and it is not always easy to find land available for sale that is conveniently located and of the desired quality and amount. In many areas it is practically impossible to purchase land. Transfer is by inheritance, and the tendency in many cases is to subdivide land rather than to combine it.

Another obstacle has to do with knowledge and skills. One elderly farmer remarked not long ago that he was too old to learn how to operate these new fangled machines. He had begun farming with horse power and was not inclined to change to more modern methods. In many cases the proper adjustments may mean changing the kinds of crops and livestock. Lack of familiarity and skills with these new enterprises raises a barrier to change.

Limitations in quality of resources pose another obstacle to ready adjustments. The conditions of soil and moisture, and location of markets essentially preclude changes in the type of farming in many areas. Most of our western wheat lands have limited alternatives except livestock grazing. Shortage of irrigation water precludes adjustments on other farms. Short growing seasons restrict the use of some land to certain forms of livestock. A great deal of experience, judgment, and information is needed to determine the feasibility of certain changes.

In addition to these problems of the individual farmer, the impact of changes often extends to the community and its institutions. In some respects it is as difficult for community institutions to adjust to

declining populations as it is to provide for expanding populations. Associated with the desire and need to maintain the population of rural communities is the desire on the part of families to remain together. Most farmers want to pass their farms on to their sons and also to keep their other children close by them. The adjustments in agriculture involve the moving of many young people out of the agricultural areas into non-agricultural industries. These, oftentimes, are distant from the farm home.

To refer to this combination of physical, economic, and social problems as being complex is trite. The problems of each farmer are somewhat different from those of every other farmer. However, many elements of the farm problem are common to all farms in a given area.

#### To Study Farm Adjustment in Utah

To understand better the direction that future changes in Utah's agriculture should take to meet market demands and to provide satisfactory incomes for farm families, the Utah Agricultural Experiment Station is planning research studies. These studies will help farmers to understand the obstacles to adjustments in farming and provide information on which sound management decisions can be made.

The initial study will project the future pattern of agriculture in the state. Following this, more detailed studies will be made in local areas. These will attempt to inventory the agricultural resources and determine how they can best be used in the future.

#### CHRYSANTHEMUMS

(Continued from page 61)

flowers of most of the early and very early chrysanthemum varieties may be severely damaged or killed. Buds may be damaged or only slightly damaged and afterwards develop into normal flowers.

*Growth:* A good variety of chrysanthemums must produce a strong



plant. It is equally important that it will develop vigorous shoots from the crown in the spring for propagation. Some varieties are unsatisfactory in this characteristic and as a result are difficult to maintain from year to year.

**Wind and weather resistance:** The beauty of a variety is enhanced when the flowers are produced on strong stems. Bending down, lodging, or breaking can detract from an otherwise good variety. Varieties which are heavily branched on the upper part of the stem often show more lodging and breaking. Stems which are soft in texture or are poorly attached at the crown may lodge or break easily. Good wind and weather resistant types have stiff, often wiry stems and branch closer to the ground.

Our variety testing has also shown some remarkable variations in the resistance of flowers and buds to early frost. Where the flowers of some varieties were only slightly nipped, those of others were severely damaged. In some instances the buds were also injured. In areas where early frosts are doing much damage, chrysanthemums that have such resistance may be favored.

#### Select Varieties For Different Flowering Seasons

The largest and most colorful chrysanthemum flowers grow in October when the summer heat is broken, the nights are cooler, and the humidity is higher. A wide field on hybridizing is still open in producing varieties with more resistance to warm weather on the one hand, and increased frost tolerance of the flowers on the other hand.

#### Breeding of Chysanthemums

The breeding of new chrysanthemum varieties has greatly increased in recent years. A number of large nurseries have well-trained hybridizers who devote their time largely to the development of chrysanthemums. A number of state universities also make chrysanthemum breeding a major horticultural proj-

ect. Their breeding programs are directed for their special climatic conditions or for the special desires of the florist or landscaping business. The University of Minnesota developed low-growing ornamental and cut flower types. The University of New Hampshire is working on frost tolerance of the blooms and highly increased winter hardiness. The University of Nebraska introduced varieties with noticeable wind and weather resistance.

A large number of amateurs are also engaged in hybridizing and are responsible for some varieties. In numerous cases sports and mutations have resulted in excellent varieties.

#### Variety Trials in Farmington

Around 200 varieties have been grown under careful observation at Farmington. Records have been taken on winter hardiness, earliness, tolerance of flowers and buds to early frost, wind and weather resistance, vigor, height, spread, and number and size, type and color of flowers.

This article lists only varieties which have been hardy in our trials. Some are exceptionally good in winter hardiness, ease of propagation, and earliness.

Many highly valuable varieties are not recommended because they lack winter hardiness or bloom too late. On the other hand, many good varieties offered on the market have, as yet, not been tested. Therefore, the varieties listed do not include all of the good varieties but only those we have tested.

#### Varieties With Different Flowering Seasons

**Group A** — Very early varieties. Begin blooming in August and early September:

Cedar Wax Wing—red, 3 inches  
Christopher Columbus—ivory white  
Golden Hours—canary yellow, hardiness fair  
Moonbeam—creamy yellow, 3½ inches  
Plainsman—yellow bronze

**Group B** — Early varieties beginning to bloom between the 15th and 30th of September. (cushion types not included)

Ann—white, 3 inches  
Avalanche—snow white  
Chippa Red—maroon red  
Charles Nye—yellow orange, 3½ inches  
Cuckoo—lemon yellow  
Fascination—silvery lavender, 3¼ inches  
Joan Helen—red  
Kiowa—red brown  
Lee Povel—yellow, 3½ inches  
New Marjorie Hills—deep bronze red, 3¼ inches  
North Platte—yellow, 3½ inches  
Pheasant—deep bronze orange  
Phoebe—bronze orange  
September Gold—orange yellow  
Swallow—buff cream, 4½ inches

**Group C** — Medium early varieties. Begin to bloom first week of October.

Cockatoo—white with creamy center, 3½ inches  
Country Girl—single type, pink  
Desert Quail—lavender pink, 3½ inches  
Golden Swallow—gold  
Kingbird—rose-pink, 3¼ inches  
Kingfisher—red  
Leshara—red  
Meadow Lark—brown, orange yellow, 3½ inches  
Pink Surprise—pink, 3 inches  
Sea Gull—white, 3½ inches  
Tanager—bright red

**Group D** — Medium late varieties. Beginning to bloom between October 8 and 15.

Allegro—silvery salmon pink  
Betty—pink  
Caliph—deep velvet red  
Cardinal—deep cardinal red  
Carnival—bright bronze orange  
Elsie—daisy type of bronze orange  
General McArthur—red orange  
Glowing Coals—purple red  
Grosbeak—light red  
Huntsman—scarlet orange  
Jean Treadway—raspberry pink  
Killdeer—orange  
Kristine—pink, daisy type  
Lavender Lady—pink-lavender  
Mrs. Pierre S. Dupont—orange salmon pink  
Olive Longland—peach brown  
Snow Elf—pure white  
Summer Time—yellow orange  
Trush—yellow ivory

**Group E** — Varieties with fair winter hardiness, but excellent in other aspects.

Apache—oriental red, 4½ inches  
Canary—canary yellow  
Charles Nye—yellow  
Cindy—glowing velvet red  
Gold Finch—yellow  
Joan Helen  
Jubilee—pompon type, red  
North Platte  
Ponca—light purple red  
Wood Duck—light red  
Yellow Avalanche—lemon yellow

**Group F** — Cushion types. Early varieties.

Glow Worm—tangerine





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Golden Cushion—orange-yellow  
Maple Mound—red-purple orange  
Orchid Helen—orchid lavender  
Powder Puff—ivory white  
Salute—red

#### Group G — Medium early varieties.

Fushia Fairy—common red  
Golden Carpet—yellow  
Supreme Yellow  
White Cushion  
Yellow Blanket

#### Group H — Medium late varieties.

Major Cushion—salmon pink  
Mischief—purple amaranth, daisy type  
New Gold Cushion

#### Group I — Button types.

Bo Peep—ivory, late variety, winter hardiness fair  
Bright Eye—bright orange, medium early  
Chiqueta Button—yellow, early variety, winter hardiness fair  
Marquette Button—orange, medium early, winter hardiness fair  
Pink Jewel—pink, winter hardiness fair, medium early  
Rosette Button—brown reddish pink, medium early, winter hardiness fair  
Yellow Supreme—medium early, winter hardiness fair

#### Group K — Spoon type.

Apricot Spoon—bronze red, medium late  
Pumpkin Spoon—medium early, orange red, winter hardiness fair  
Remembrance—brown red, medium late  
White Spoon—medium early

#### Varieties With Flowers Tolerant To Early Frost

Low temperature during two nights on October 7 and 8, 1955, froze all flowers with few exceptions. Most of the mature flowers of the chrysanthemums were frozen; however, most of the buds in maturing stage were not or only slightly damaged. A survey taken

October 11, has shown the varieties listed in Group L as more resistant. *Group L* — Varieties with flowers more or less tolerant to early frost.

Charles Nye  
Chippa Red  
Christopher Columbus  
Desert Quail  
Eternal Snow  
Joan Helen  
Jubilee  
Judith Anderson  
Leshara  
Lee Povel

Maple Mound  
Orchard Oriole  
Phoebe  
Princess Margaret  
Salute  
Sea Gull  
September Gold  
Tanager  
Wood Duck  
Joyous

#### Cultural Recommendations for Growing Chrysanthemums

**Soil:** A well drained soil with high content of organic matter is ideal. Maintain and increase it with manure, mulch, compost, peat moss.

**Fertilizer:** The soil should be well fertilized. (10 parts nitrogen and 20 parts phosphorous). A general recommendation can be made of applying 400 to 500 pounds per acre of a 10-20-0 fertilizer at planting time and during the growing season. This amount can be divided into three applications; one at planting time and the other at two or three weeks intervals following.

**Watering:** Ample supply of water is important during hot weather and to obtain a good branching after pinching.

**Mulching:** Mulching is beneficial during the hot season and also during the winter as winter protection. For this purpose from three to five inches of mulch should be placed on frozen ground. A soil

that is frozen all winter is less damaging than when alternate freezing and thawing takes place.

**Propagation and planting:** If possible, transplant chrysanthemums every year. This will result in shorter and better formed plants as well as higher quality flowers.

Vigorous healthy shoots at the periphery of the old plants give good material for propagation. At planting time in May they are sufficiently rooted so that they can be transplanted directly. One succulent healthy shoot is sufficient for a new plant. Smaller shoots can be planted two and three together.

Cuttings taken in spring produce good plants. However, it is important to transplant them right after rooting to prevent extreme hardening and encourage an immediate vegetative growth.

**Planting time:** The best planting time is in May and June. The earlier planting is necessary for a large, well-branched plant.

**Pinching:** The purpose of pinching is to encourage early and low placed branching as well as to develop plants that are more resistant to adverse weather conditions.

**How to pinch:** As soon as young shoots are 3 to 4 inches long they can be pinched by removing the shoot tip. Branching is slow and poor when the shoots are pinched late and are hard and woody.

Cushion types pinch themselves. They produce early buds which close up the terminal growth and produce side branching.

Do not delay pinching beyond July 10, otherwise flowering is also delayed. Two pinchings are usually possible.

**Disbudding:** Large flowering varieties can be successfully disbudded by removing all side buds. One well developed center bud per stem is a good start for a large and well formed flower.

**Spraying and dusting:** Spraying or dusting at regular intervals is necessary if one is to control such insects as mites, thrips, and aphids.